



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/330,231	06/10/1999	ROBERTO PASSERONE	3964-US	9152

23639 7590 01/15/2004
BINGHAM, MCCUTCHEN LLP
THREE EMBARCADERO, SUITE 1800
SAN FRANCISCO, CA 94111-4067

EXAMINER

KING, JUSTIN

ART UNIT PAPER NUMBER

2111

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/330,231

Applicant(s)

PASSERONE ET AL.

Examiner

Justin I. King

Art Unit

2111

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see paper 16, filed 10/15/03, with respect to the rejections of claims 1-22 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the combination of the Akella and Netravali.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-9 and 11-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over J. Akella et al's Synthesizing Converters Between Finite State Protocols (application's specification pages 4-5) in view of Netravali et al. (U.S. Patent No. 5,680,552).

Referring to claim 1: Synthesizing Converters Between Finite State Protocols discloses two finite state machines and a third finite state machine for a method of transferring valid data (specification page 5, lines 3-4). The finite state machine (FSM, also known as automaton) has been long used for data processing simulation, and it is a common and inherited practice to generate a FSM based a set of given inputs or regular expressions. Hence, J. Akella and K. McMillan's computer design includes a mean for receiving a first representation/protocol with regular expressions and a mean for receiving a second representation/protocol with regular expressions, and J. Akella and K. McMillan's computer design also includes a mean to generate a finite automaton for each representation. The specification (page 5, lines 3-4) explicitly discloses that the third FSM represents the valid data transfer; such that it is said the third FSM represents one or more permitted operations of said first and second FSMs.

The Akella's computer design creates a product machine, which is pruned of invalid/useless states (specification, page 5, line 5). Since the third FSM only represents the valid data operations between the two protocols, and each protocol's invalid operations or un-convertible operations become non-deterministic (invalid/useless), it is clear that the third FSM only processes the operations, which are deterministic, and thus discards the un-deterministic operations.

The topic of the Synthesizing Converters Between Finite State Protocols and the third FSM's given description have explicitly directed Akella and McMillan's computer design to a communication establishment between two FSMs, which is equivalent to the claimed interface. Although Akella and McMillan does not explicitly disclose *automatically* synthesizing the interface between the first and second protocols based on the first and second finite automata in the disclosed section.

Art Unit: 2111

Netravali discloses that it is known to automatically synthesize the protocol converter (column 1, lines 36-67, column 2, lines 1-7). Furthermore, the court has held that broadly providing a mechanical or automatic means to replace manual activity, which accomplishes the same result, involves only routine skill in the art. Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Netravali's teaching to the Akella because Netravali enables one to construct the converter in a relatively short time and the converter can be changed quickly to adapt to changes in the protocol specification (column 1, lines 52-55).

Referring to claim 2: Claim 1's argument applies; furthermore, each FSM is designed to move to different states in responding to the input data, such inherent FSM behavior is the claimed automatically corresponding data from the first and second protocol.

Referring to claim 3: Claims 1-2's arguments apply; furthermore, Netravali discloses that it is to know to translate data between two protocols and rectify any mismatches.

Referring to claim 4: Claims 1-2's arguments apply; furthermore, the initial state's identification, first sequence's identification, regular expression's derivative's constructions, and equivalent expressions' eliminations are the fundamental and basic steps for building a FSM.

Referring to claim 5: Claims 1-2 and 4's arguments apply; furthermore, collecting and integrating data are the fundamental and basic steps for data analysis in a FSM.

Referring to claim 6: Claims 1-2 and 4-5's arguments apply; furthermore, claim 6 is rejected over the claim 3's argument stated above.

Referring to claim 7: Claim 1's argument applies; furthermore, claim 7 is rejected over the claim 3's argument stated above.

Art Unit: 2111

Referring to claim 8: Claim 1's argument applies; furthermore, it is clear that since the protocol converter (third FSM) converts two different protocols (first and second FSMs), either every state or selected states from two FSMs will interface via the third FSM. Each FSM remains their own independent operations and each FSM may receive and transmits data to each other via the third FSM. The only communication is either receiving data or transmitting data; and since the third FSM functions as the converter, it is said the third FSM's states will be their new states to convert data into the opposing protocol's standard. These are fundamental and basic steps for establishing converters among different protocols/FSMs.

Referring to claim 9: Claims 1 and 8's arguments apply; furthermore, the third FSM represents the valid data transfers (specification, page 5, line 4), and in order for any data transfer to be valid, it cannot result in a data inconsistency.

Referring to claim 11: Claim 1's argument applies; furthermore, claim 11 is rejected over the claim 4's argument stated above.

Referring to claim 12: The storage device and processor are inherent in every computer design. Each protocol needs to transmit its own data to processor to be processed, and this inherited mean for transmitting is equivalent to the receiving unit.

Synthesizing Converters Between Finite State Protocols discloses two finite state machines and a third finite state machine for a method of transferring valid data (specification page 5, lines 3-4). The finite state machine (FSM, also known as automaton) has been long used for data processing simulation, and it is a common and inherited practice to generate a FSM based a set of given inputs or regular expressions. Hence, J. Akella and K. McMillan's computer design includes a mean for receiving a first representation/protocol with regular expressions and a mean for receiving a second representation/protocol with regular expressions, and J. Akella and

Art Unit: 2111

K. McMillan's computer design also includes a mean to generate a finite automaton for each representation. The specification (page 5, lines 3-4) explicitly discloses that the third FSM represents the valid data transfer; such that it is said the third FSM represents one or more permitted operations of said first and second FSMs.

The Akella's computer design creates a product machine, which is pruned of invalid/useless states (specification, page 5, line 5). Since the third FSM only represents the valid data operations between the two protocols, and each protocol's invalid operations or unconvertible operations become non-deterministic (invalid/useless), it is clear that the third FSM only processes the operations, which are deterministic, and thus discards the un-deterministic operations.

The topic of the Synthesizing Converters Between Finite State Protocols and the third FSM's given description have explicitly directed Akella and McMillan's computer design to a communication establishment between two FSMs, which is equivalent to the claimed interface. Although Akella and McMillan does not explicitly disclose *automatically* synthesizing the interface between the first and second protocols based on the first and second finite automata in the disclosed section.

Netravali discloses that it is known to automatically synthesize the protocol converter (column 1, lines 36-67, column 2, lines 1-7). Furthermore, the court has held that broadly providing a mechanical or automatic means to replace manual activity, which accomplishes the same result, involves only routine skill in the art. Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Netravali's teaching to the Akella because Netravali enables one to construct the converter in a

Art Unit: 2111

relatively short time and the converter can be changed quickly to adapt to changes in the protocol specification (column 1, lines 52-55).

Referring to claim 13: Claim 12's argument applies; furthermore, claim 13 is rejected over the claim 2's argument stated above.

Referring to claim 14: Claims 12-13's arguments apply; furthermore, the third FSM's converting function between different protocols is equivalent to the translation unit.

Referring to claim 15: Claims 12-13's arguments apply; furthermore, claim 15 is rejected over the claim 4's argument stated above.

Referring to claim 16: Claims 12-13 and 15's arguments apply; furthermore, claim 16 is rejected over the claim 5's argument stated above.

Referring to claim 17: Claim 12's argument applies; furthermore, claim 17 is rejected over the claim 14's argument stated above.

Referring to claim 18: Claim 18's argument applies; furthermore, claim 18 is rejected over the claim 8's argument stated above.

Referring to claim 19: Claim 19's argument applies; furthermore, claim 19 is rejected over the claim 9's argument stated above.

Referring to claim 20: Claim 1's argument applies.

Referring to claim 21: Claim 20's argument applies; furthermore, Since the third FSM only represents the valid data operations between the two protocols, and each protocol's invalid operations or un-convertible operations become non-deterministic (invalid/useless), it is clear that the third FSM only processes the operations, which are deterministic, and thus discards the un-deterministic operations.

Referring to claim 22: Claim 1's argument applies.

Art Unit: 2111

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akella in view of Netravali, and in further view of Mano's Computer System Architecture.

Referring to claim 10: Claims 1 and 8's arguments apply; as stated in the claim 1's argument, the identifying the non-deterministic transition and determine a transition state for each input are fundamental practices in FSM's construction. However, Akella and Netravali do not explicitly mention the priority. The Computer System Architecture, a popular academic textbook, discloses that it is a well-known practice to implement the priority setting in each system. Thus, it would have been obvious to one having ordinary skill in the computer art to adopt the priority practice into the Akella and Netravali because it enables the system to allocate resource to tasks according to their time sensitivities.

Conclusion

6. The prior art made of recorded and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,845,107 to Fisch et al.: Fisch discloses a signal conversion between two different protocols.

U.S. Patent No. 6,308,147 to Keaveny, Thomas A.: Keaveny teaches that it is known to have the finite state machine dynamically translating address and manipulating the bus control primitives outside of the address phase.

U.S. Patent No. 5,663,666 to Chun et al.: Chu discloses a finite state machine connected to mixed means and a frequency synthesizer, and the finite state machine interprets the mixed signals and generates action commands.

Art Unit: 2111

U.S. Patent No. 6,223,274 to Cathoor et al.: Cathoor teaches that it is known to reuse the IP block.

Jerry M. Rosenberg, Computers, Information Processing & Telecommunications, 1983, John Wiley & Sons, Inc.: Rosenberg discloses that prioritize a task is well known in the computer field.

Andrew S Tanenbaum, Structured Computer Organization, 1990, Prentice-Hall, Inc., 3rd Edition: Tanenbaum discloses that software and hardware are interchangeable.

Young, James Shin, Synchronization of Java Threads Using Rendezvous, 1997, <http://www-cad.eecs.berkeley.edu/~jimmy/java/rendezvous>: Young discloses that it is known to identify the non-deterministic states by analyzing all events in a thread effecting the other treads' event behavior, and Young teaches one to impose an order on all such interacting events to eliminate the non-determinism.

Cohen, Daniel I.A., Introduction to Computer Theory, 1997, John Wiley & Sons, 2nd Edition, chapter 6: Cohen teaches one to crate an absorbing non-accepting state.

Bumble, Marc, and Coraor, Lee, Architecture for a Non-Deterministic Simulation Machine, 1998, Computer Science and Engineering, The Pennsylvania State University, page 1600: Bumble and Coraor teach one to eliminate impotent events by splitting event queues.

Chapman, Matt, The Finite State Machine Explorer, 1996, <http://www.belgarath.demon.co.uk/java/fsme.html>: Chapman discloses his academic software implementation of the FSM from University of Warwick, England.

T. Funkhouser, COS 126 lecture: Formal Languages, spring 1999, <http://www.cs.princeton.edu/courses/archive/spr99/cs126/comments/16hornsky.html>: Funkhouser's computer science 126 class teaches students to eliminate non-deterministic states.

Art Unit: 2111

National Institute of Standards and Technology (NIST), <http://www.nist.gov/>: the NIST's web site provides the definitions for finite state machine, automaton, and non-deterministic finite state machine.

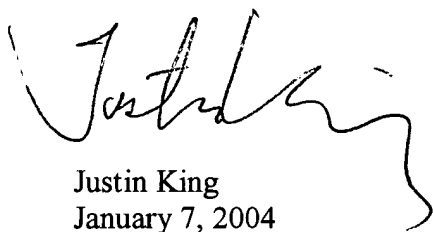
Network Innovation Laboratories, Register Transfer Level Design, 1998, <http://www.onlab.ntt.co.jp/member/imlig/sem98/tuthtm/node6.htm>: the article illustrates the register transfer level design.

H.H. Ehrenburg and H.A.N. van Maanen, A finite automaton learning system using genetic programming, 1994, CWI Centrum Voor Wiskunde en Informatica Report Rapport: the article discloses the automatically self-learning FSM.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin King whose telephone number is (703) 305-4571. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:00 P.M..

If attempts to reach the examiner by telephones are unsuccessfully, the examiner's supervisor, Mark Reinhart can be reached at (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose number is (703)-306-5631.



Justin King
January 7, 2004



XUAN M. THAI
PRIMARY EXAMINER
TC2100